

(pers. comm.) states that no live pupa have been found near Davis after Christmas, and that the species resumes flight in late Spring (April to June in different years), suggesting annual reimmigration.

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Courtship of a model (*Adelpha*; Nymphalidae) by its probable Batesian mimic (*Limenitis*; Nymphalidae)

Silberglied (1977, in *How Animals Communicate*, T. Sebeok, ed., Indiana Univ. Press, Bloomington, Indiana) suggested that optimal mating behaviors of organisms involved in mimicry associations should involve communication modes not shared by vertebrate predators. Because predation pressure causes natural selection for convergence in flight behaviors as well as gross wing pattern characteristics between mimics and their models, behaviors associated with species recognition during courtship are expected to not rely heavily on visual cues whether the species involved is a model or a mimic.

Observations on interspecific courtships allow insights concerning which traits are important for mate recognition within species. Shapiro (1985, *J. Res. Lep.* 24: 79–80) reported a case of confounded courtship where in the male of a presumed model species (*Erynnis propertius* Scud. & Burg., Hesperidae) pursued a female mimic (*Euclidea ardita* Franc.; Noctuidae). Contrary to the prediction above, the male appeared to be relying exclusively on visual cues. In the following case the sexes are reversed – the pursuing male is the mimic.

Adelpha bredowii californica (Butler) and its presumed Batesian mimic *Limenitis (Basilarchia) lorquini lorquini* (Boisduval) are sympatric below 2100 m. elevation throughout the Coast Ranges and Sierra Nevada in California. Both species are dark brown with a prominent creamy white band across both sets of wings and an orange tip on the forewing. These butterflies fly together in the same canyons, and males often compete for territories in the sunny patches of stream beds. The mimicry relationship has never been formally tested, but is widely inferred from both the sympatry and the documentation of Batesian mimicry in other species of *Limenitis* (e.g., Platt, Coppinger, & Brower, 1971, *Evolution* 25: 692–710).

While collecting *L. lorquini* and *A. b. californica* for laboratory studies, I encountered a male *lorquini* courting a female *b. californica*. The sighting occurred at 1355 hrs, 22 April 1986, in Mix Canyon, Solano Co., California (approx. 10 km. north of Vacaville), and lasted until 1359 hrs, when the pair was lost from sight. When initially encountered, the courtship was in progress, with both butterflies fluttering one to two meters above the road at the edge of a small sunlit area. After about thirty seconds, the female began flying faster,

with the *lorquini* in hot pursuit (i.e., within 10 cm). The pair made a number of wide circles in a large (30 m) sunny area above a stream adjacent to the road, ending when the female alit on a shrub (*Quercus dumosa* Nutt., Fagaceae; a possible foodplant of *b. californica*). The *lorquini* male immediately alit beside her and nudged her with his curled abdomen in repeated attempts to copulate. The female avoided this by turning her abdomen away from the male or by short flicks of the wings. These behaviors continued for approximately one minute, then the male flew to a nearby (2 m) bush and perched while the female basked. When the female flew again after an interval of approximately 90 seconds, the male gave chase, and the pair was lost from sight. The weather was sunny and clear with little wind, temperature approximately 26°C. *A. b. californica* males were quite common in the canyon, but only eight *lorquini* males were seen over the span of three hours. Additionally, three *b. californica* females and one *lorquini* female were collected. These densities are representative of most spring seasons.

Because I did not see the beginning of the encounter, it is not clear whether the female above initiated the fluttering courtship flight using wing pattern cues from the male *Limenitis*, or if receptive females simply initiate the fluttering flight whenever pursued. It does appear clear, however, that the female *Adelpha* rejected the inappropriate suitor only after she had begun the fluttering courtship display. Whether this was on the basis of visual or pheromonal cues remains unknown. The male *lorquini* seemed completely unaware of his *faux pas* throughout the encounter. As in *Erynnis* reported by Shapiro (*op. cit.*), male *Limenitis* appear to rely exclusively on visual cues during courtship.

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A Bibliography of *Euphydryas*

Checkerspot butterflies of the genus *Euphydryas* are among the most well studied Lepidoptera, and have become key organisms for testing ecological and evolutionary theory. Here we have compiled a bibliography of papers concerning this genus. We suspect that this bibliography will be a useful resource both to those working directly with *Euphydryas* and to those with a more general interest in butterfly ecology. The topics included cover distributional notes, population dynamics, population genetics, host plant and parasitoid interactions, and behavior. We have endeavored to make this bibliography as complete as possible, but in an effort to produce a bibliography of manageable size we have excluded most taxonomic descriptions. Those for the most part are referenced in Gunder (1929), Miller and Brown (1981, A Catalogue/Checklist of the Butterflies of America North of Mexico. The Lepidopterists Society Memoir No. 2), Kudrna (1985, Butterflies of Europe; Concise Bibliography of European Butterflies. AULA-Verlag Wiesbaden), and various works by Higgins.

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